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in the granite rocks about Harney Peak,' but there is no statement in reference to the production of the mines in this region, the development of which has been a subject of general interest. The best building stones of the State are the red Sioux quartzite of the Archæan, while in the Black Hills is the gray or reddish Dakota sandstone of the Cretaceous, which is said to compare very favorably with the well known Berea stone of northern Ohio.

The State Geologist expresses the hope that this Bulletin 'may be but the first of a long series' that will be published by the State, and the geologists of the country heartily echo this wish. It remains for the prosperous agricultural States of the 'Great Plains' to remove the stigma resting upon them in having neglected for so many years the study of their natural history and geology. It is not true, as has been popularly supposed, that they are comparatively barren in mineral resources, and, furthermore, there are problems of the greatest scientific interest awaiting investigation. The failure by the Dakotas, Nebraska and Kansas to provide for adequate geological surveys is in marked contrast to the liberal support which such surveys have received from the tier of States to the east—Minnesota, Iowa, Missouri and Arkansas—surveys which have accurately described the geology of those States and made known their natural resources, the development of which has added greatly to their wealth.

C. S. PROSSER.

Die Chemie der Zuckerarten. By DR. EDMUND O. VON LIPPMANN. Braunschweig, Vieweg und Sohn. 1895. Pp. xxvi+1176.

In 1879 von Lippmann published in the *Zeitschrift des Vereins für die Rübenzucker-Industrie des Deutschen Reichs*, a memoir entitled 'Monographie der Zuckerarten.' This valuable compilation was practically a summary of all that was known at that time about the more important carbo-hydrates; it filled about seventy quarto-pages of the journal in which it appeared.

Three years later the author followed the treatise named with a book, 'Die Zuckerarten und ihre Derivate.' This was based on his former publication and aimed to present all known

facts regarding the physical and chemical properties of the different sugars.

The unexpected and certainly unprecedented growth which sugar chemistry experienced within the decade following the issue of this work, made a new, up-to-date, issue of the same greatly needed and desired. Numerous requests to undertake this task were addressed to its author and these wishes were finally responded to by the publication of the work forming the subject of this notice.

Die Chemie der Zuckerarten has its subject-matter divided into four parts, which, in turn, are subdivided into sections.

The first three parts are given to, respectively, the mono-, the di- and the tri-saccharides. The fourth part contains discussions on: the constitution, configuration and synthesis of the sugars; the relations of optical and calorimetric constants; the origin of the sugars in plants; the physiological importance of the sugars.

The saccharides are arranged and discussed in sequence according to the number of carbon atoms they contain. Thus, of the mono-saccharides, the bioses, sugars having two atoms of carbon, are first considered; next come the trioses, the tetroses, the pentoses, etc.

The hexoses (the $C_6H_{12}O_6$ group) are divided into the aldo- and the keto-hexoses; the former exhibiting the aldehyde-structure, the latter containing the characteristic ketone-group. Dextrose (d-glykose) is a representative of the former, levulose (d-fruktose) of the last-named class.

No less than 234 pages are given to dextrose. This may indicate the thoroughness which characterizes the whole work.

The most important of the di-saccharides, is of course, sucrose (cane sugar). The author devotes 244 pages to its consideration. Lactose, maltose and iso-maltose are also given exhaustive treatment in this part of the book.

The leading representative of the tri-saccharides is raffinose. This substance, melecitose and a few other carbo-hydrates of analogous constitution receive the attention due them, and are followed by the learned and able disquisitions on the constitution, configuration and synthesis of the sugars, etc., previously mentioned.

Very full and complete indices of subjects and authors conclude the volume.

The time and labor expended merely in the collection of the material contained in this publication must have been enormous. Some faint conception of this may perhaps be gained on learning that no less than two thousand two hundred and twenty-two authors are referred to or quoted in its pages, exact reference to their writings being given in all cases.

The style throughout is scholarly and lucid. The treatment of the subject-matter is fair and impartial. No pains have been spared to make this work a standard one; beyond question, von Lippmann's *Chemie der Zuckerarten* is a classic of chemical literature.

FERDINAND G. WIECHMANN.

SCIENTIFIC JOURNALS.

AMERICAN JOURNAL OF SCIENCE.

THE March number contains three articles upon the subject of the Röntgen rays, which has excited so much interest during the past month. The first of these is by A. W. Wright. After a brief history of the subject, the author describes in some detail the experiments which have been performed at the Sloane physical laboratory in New Haven. These have yielded results similar to those described elsewhere, but with a remarkable degree of refinement. Examples are given of a picture made from an aluminum medal, in which the relief on both sides is shown, also the lettering and milling around the edge. It is stated that in the original negative it is almost possible to decipher the individual letters. The details are given of the special methods which have been found most successful in yielding good results. Some of the typical pictures obtained are given on an accompanying plate. A second plate shows the impressions given upon a sensitive surface by diverging stream lines through two parallel slits in a copper plate. Three experiments were performed: first, with both slits open simultaneously; second, with only one open at a time, so that the streams were independent; and third, with the two streams passing by a powerful magnet. The first two showed very little, if any, distinct action between the

streams themselves as regards their direction. The effect of the magnet in the third case was also negative. In another experiment, however, in which a very thin gold leaf was interposed in the path of the rays, a deflection by the magnet of about half a degree was observed, due to the loading of the streams with metallic particles; the mutual repulsion of the streams was also clearly shown. In all these cases the rays were proved by measurement to leave the surface of the glass of the vacuum tube nearly normally. The article closes with a quotation from an earlier paper (1870) by the same author, upon electrical shadows from the Holtz machine, to a certain extent anticipating the results that have recently excited so much interest.

The paper by Trowbridge shows how pieces of metal can be located, for example, in the human body by cathode photography, based upon a principle analogous to that employed in the Rumford photometer. He used two Crookes' tubes with two terminals at an angle with each other, and excited by a Tesla coil. The author states that by use of the Tesla coil he has succeeded in obtaining pictures in less than a minute. The destruction of the tubes is prevented by placing them in a vessel filled with paraffine oil, while the oil is cooled by snow or ice placed outside.

The third article, by H. A. Rowland, W. R. Carmichael and L. J. Briggs, discusses briefly the sources of the rays. By using a tube of a very high degree of exhaustion it was demonstrated conclusively that the main source of the rays was a minute point on the *anode* nearest to the cathode. At times a minute point of light appeared at this point but not always. Added to this source the whole of the *anode* gave out a few rays. From the cathode no rays whatever came; neither were there any from the glass of the tube where the cathode rays struck it as described by Röntgen. "In the other tubes there seemed to be diffuse sources, probably due in part to the oscillatory discharge, but in no case did the cathode rays seem to have anything to do with the Röntgen rays."

The first article of the number is by J. B. Hatcher upon 'Recent and Fossil Tapirs.' In this he gives a detailed description of the